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## Keywords

paleodemography, biological affinity, ossuaries, Iroquois

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## Ossuary Internments as a Framework for Osteological Analysis: A Critical Approach to Paleodemography and Biological Affinity

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Robert Rost

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### ABSTRACT

In this paper a bioarchaeological approach for reconstructing paleodemography and biological affinity is presented. It emphasizes the importance of recognizing the theoretical and methodological limitations of physical anthropology and archaeology. Paleodemography is limited by the inaccuracy of age and sex determinations. The statistical calculation of the biological distances between separate skeletal populations is discredited by controversy regarding the interpretations and recording of nonmetric traits. This bioarchaeological approach recognizes that the analyst must account for these methodological limitations, as well as the natural and cultural processes (i.e. mortuary practices) that dictate the composition of the skeletal sample.

The necessity of this approach is illustrated by discussing the mortuary practices of the prehistoric and historic Iroquoians of the Northeast. It is argued that ossuaries provide a unique opportunity to address broader issues in archaeological discourse, including the impact of European diseases, village population estimates, and the "origins" of the historic Iroquoian polities.

*... an occupational hazard of those dealing with material from archaeological sites lies in the difficulty of drawing valid conclusions from the relatively small samples which usually represent each population (Anderson 1968:142; emphasis added).*

*Doubt is the beginning, not the end, of wisdom (Anonymous, cited in Wonnacott and Wonnacott 1990:549).*

For years physical anthropologists have been providing archaeologists with methodological suggestions regarding the use of human remains. Most of this information is not explicitly used for addressing broader theoretical issues in archaeology (Larsen 1987:339–340, 1994:112; Molto 1983:3). This paper will illustrate how the analysis of human remains could be used to define prehistoric/historic Huron populations. In particular, I consider the benefits and limitations of analysing the osteological remains from an ossuary. Ossuaries provide a unique opportunity to examine relatively representative osteological samples for reconstructing demographics and biological affinities of prehistoric/historic populations. This paper discusses:

1) the ossuary as a cultural practice and a framework for osteological investigations;

2) the importance of paleodemography; and

3) the analysis of non-metric traits in order to test biological relationships between prehistoric populations.

### OSSUARY INTERMENTS AS MORTUARY PRACTICE: A FRAMEWORK FOR HUMAN OSTEOLOGICAL ANALYSIS

The analyses and interpretations of paleodemography and biological affinity are restricted by the unique limitations and requirements of physical anthropologists (e.g. aging, sexing; Ubelaker 1974:5). These methodological limitations are compounded by the fact that human remains, which primarily derive from archaeological contexts, are subject to a number of natural and cultural processes (Larsen 1987, 1994:113; see Schiffer [1987] for a detailed discussion). The former includes chemical and physical factors (e.g. soil acidity, root damage), degradation, decomposition and bio-turbation (White 1991:357–367), while the latter include recent ploughing, looting and mortuary practices (Larsen 1987:287, 1994; White 1991:374). These natural and cultural processes can produce a bias concerned with the degree to which the samples accurately reflect the "real population" that once existed (White 1991:113). In this section, I discuss the cultural processes related to ossuary internments; the natural processes affecting human remains are mentioned throughout this paper.

The proposed framework for the osteological analysis of ossuaries is based on the mortuary practices of the best ethnographically and archaeologically documented Iroquoian polity in the Northeast—the Huron (Jamieson 1989:310). What is known about Huron mortuary practice is largely based on the account of Breffeu, a Jesuit priest who witnessed the "Feast of the Dead" in 1636 in Ossossané (White 1966:15; Kidd 1953:372–375; Molto 1983:83; JR 10:279), and subsequent excavation of Ossossané by Kidd (1953) in 1947–48. This framework should not be applied uncritically to other Ontario Iroquoian polities (i.e., Neutral, Erie, and Petun) since mortuary practices varied locally between the Huron and other polities (Spence 1994:7–8; White 1966:16; Jamieson 1995; Kenyon 1984; Jackes 1988). Nevertheless, an ossuary has several "characteristics" which have implications for human osteological methods and research goals.

An ossuary burial entails the periodic and collective secondary deposit of individuals who were previously interred separately and elsewhere (Ubelaker

1974:8; Jirikowic 1990:355). This periodic burial of individuals took place after a culturally prescribed number of years (Ubelaker 1974:8). The human remains in an ossuary consist primarily of disarticulated bones, but may also include a number of articulated bones. The individuals interred include most members of the group, and consist of those who died after the last communal burial. There is little effort to keep the individual skeletons or groups of skeletons separate from those of others (Jirikowic 1990:355).

Ossuaries are documented ethnohistorically (e.g., JR 10:289; Tooker 1967:128–144; Trigger 1969:102–112; Heidenreich 1971:148–151; Ubelaker 1974; Jirikowic 1990). Archaeologically, ossuaries have been documented in many areas of eastern North America (Bushnell 1920). These include: Virginia, Maryland (Ubelaker 1974; Jirikowic 1990); New York Coast (Kaeser 1970); Cape Cod (McManamon and Bradley 1988); Delaware (Weslager 1942); and Ontario (Johnston 1979:90; Kenyon 1972; Jackes 1988; Anderson 1964; Churcher and Kenyon 1960; Kidd 1953; Pfeiffer 1983; White 1966; Boyle 1897; Steele and Steele 1944; Ridley 1961; Jerkic 1975; Mullen and Hoppa 1992; Stothers 1972; see also Patterson 1984; and Molto 1983).

Among the Huron, a notable characteristic of an ossuary burial is the periodic occurrence of individuals being interred together (Jamieson 1989:310). According to ethnographic accounts, the frequency of this interval ranges between eight to twelve years, and it was usually associated with the relocation of an associated village (White 1966:16; Melbye 1985:9; Pfeiffer 1984:181; Saunders 1986:9; Katzenberg and White 1979:10). This cultural characteristic allows osteologists to approximate the length of time that the sample represents (Ubelaker 1974:5; Jerkic 1975:74).

Another notable characteristic of Huron ossuary interments is the manner in which the bones were deposited into the feature (White 1966:15). According to ethnohistoric accounts, the bones were originally bundled in skins, and they were subsequently thrown haphazardly into the pit and "stirred" (White 1966:15; Tooker 1964:169). There was no attempt to signal or maintain individual difference among the dead (Jirikowic 1990:369). Subsequent excavations of Huron ossuaries, including Ossossané (Kidd 1953; White 1966:15), has largely supported this ethnohistoric account of commingling (Kidd 1953; White 1966:15). It is important, however, to note that some bones were also articulated, cremated, and/or bundled (Kidd 1953:364; White 1966; Jerkic 1975; Pfeiffer 1983:9). As a result, the bones belonging to males, females, subadults, and adults are often fragmentary, damaged, mixed, disarticulated and disassociated with one other (Anderson 1963; Jerkic 1975:74; Pfeiffer 1980:55 1983:182, Pfeiffer et al. 1985; Melbye 1983:15; Johnston 1979; Saunders 1986:9; Katzenberg and White 1979:11). This presents an obvious methodological problem for osteological analysis.

A third characteristic of an ossuary interment is related to demography. It appears that *almost* all age categories are represented in an ossuary, as well as both sexes (Jerkic 1975:186). Ethnographic documents, however, state that infants were usually not interred in ossuaries (Tooker 1964:132; Jerkic 1975:16). Instead, they were usually interred in longhouses, for mythological reasons (Knight and Melbye 1983), pragmatic reasons (Ramsden and Saunders 1986), beliefs regarding rebirth (Heidenreich 1971:40; Spence 1995), or they were buried beside paths (Jerkic 1975:16; JR 10:273 in Fitzgerald 1979; Tooker 1964:132). Moreover, it appears that ossuaries constitute only one aspect of the total Huron mortuary system (Jamieson 1989:310). For example, the Ball site, a Northern Division Protohistoric Huron village, has produced six primary burials. The age categories of these burials range from birth to middle age (Melbye 1983:27; Katzenberg and White 1979:11). Thus, although it is possible to determine the approximate completeness of the skeletal sample (Ubelaker 1974:5), the demographic validity of an ossuary has to be evaluated critically.

Another characteristic of ossuary interment, which is also related to demography, is the exclusion of certain persons dying under specified conditions (Saunders 1986:9). According to ethnographic documents, individuals who died as a result of suicide, hypothermia, drowning, or war were cremated, or buried immediately and permanently (Jerkic 1975:17; Tooker 1964:132; Heidenreich 1971; Katzenberg and White 1979:11). Archaeological investigations, however, have revealed that individuals exhibiting violence, infection, trauma, and congenital abnormalities were interred in ossuaries (Pfeiffer 1984; Pfeiffer et al. 1985; Anderson 1964).

A fifth characteristic of an ossuary is the relatively large and homogenous nature of the skeletal sample (individuals were buried in the ossuary in terms of biological and cultural affiliation). An ossuary is traditionally interpreted as an event that commences and consolidates alliances among related and unrelated communities (White 1966:22; Jerkic 1975:17; Kapches 1981:308; Molto 1983:82; Heidenreich 1971:40). The interred might include the remains of several hundred to thousands of individuals from different villages (Spence 1994:8; Katzenberg and White 1979:11), and "foreigners."

It could be argued that the subdivision within ossuaries (i.e., bundle, and cremated human remains) might reflect "foreign groups" or a concern with clan, or lineage recognition. This has not been substantiated with intra population studies for prehistoric Hurons (e.g. Jerkic 1975:17). Instead, if we accept the assumption that mate selection was determined by close proximity and that the impact of "foreign" genes is minimal (Molto 1983:84), the people buried in ossuaries were homogenous in relation to each other (Jerkic 1975:17). Moreover, it can be said the interred individuals are reasonably representative of a local and single breeding population (Molto 1983:85; Katzenberg

and White 1979:11). Although there are discrepancies between the ethnographic and archaeological attributes of Huron ossuaries (Jamieson 1989:310), it appears that ossuaries were part of a wider mortuary program wherein:

...many or most of the individuals who died within those communities during a given length of time were buried together at the same time, in the same place, and generally in the same fashion (Jirikowic 1990:361).

#### **OSSUARIES AND PALEODEMOGRAPHY: A REPRESENTATIVE SAMPLE?**

Paleodemographic investigations based on human remains "attempt to reconstruct basic biological and social facts of human life in the past—population structure, life expectancy, and mortality and fertility rates" (Jackes 1993:189). These basic biological and social facts allow bioarchaeologists to infer the following: 1) age- or gender-specific practices in mortuary programmes (Spence 1994:8; Bocquet-Appel and Masset 1982:332); 2) village and regional population estimates (Ubelaker 1974; Bamann et al. 1992); and 3) the impact of European diseases on the health of North American populations (Jackes 1992:215; Bamann et al 1992:447; Larsen 1987, 1994).

Ossuaries are unique samples for demographic analysis since they have set temporal parameters and they are relatively large in terms of minimal number of individuals (MNI, i.e. up to 1000 individuals). Due to the unique problems associated with ossuary interments, however, there are limitations in reconstructing demography: 1) the inaccuracy of age and sex determinations; 2) the problems of overlaying contemporary theories and methods on to past populations (Jackes 1991; White 1991); and 3) the uncertainty that skeletal samples are representative of a once living population (White 1991:372).

#### **Sex and Age Determination**

A sex determination can be accomplished in two ways: 1) morphological observation of various anatomical details; and 2) the calculation of discriminant functions based on observed metric data (Helmuth 1993:3). The most reliable technique is a multifocal approach whereby the pelvic morphology is examined in relation to the overall skeleton (Saunders 1978:52; Krogman and Iscan 1986:189; White 1991:319; Pfeiffer 1980:56). This approach is impossible when analysing the fragmentary and isolated human remains of an ossuary. As a result, osteologists are forced to sex isolated bone fragments (Anderson 1964:29). The methods include: the Phenice technique, the width and depth of the sciatic notch, skull morphology (Table 1), scars of parturition, and the presence or absence of the pre-audicular sulcus (Krogman and Iscan 1986:189; White 1991; Bass 1988;

St. Hoyme and Iscan 1989; Katzenberg and White 1979:13–15).

Contributing to the inaccuracy of aging and sexing isolated bone fragments is the loss of demographic data resulting from the near impossibility of sexing individuals under the age of eleven (Katzenberg and White 1979:14). In general, there is a low degree of accuracy in sexing both quantitatively (the number of individual with a determined sex) and qualitatively (the accuracy of the age).

<b>Trait</b>	<b>Male</b>	<b>Female</b>
General Size	Large	Small
Architecture	Rugged	Smooth
Supraorbital Ridges	Medium to Large	Small to Medium
Mastoid Processes	Medium to Large	Small to Medium
Occipital area	Muscle lines and protuberance marked	Muscle lines and protuberance not marked
Frontal Eminences	Small	Large
Parietal eminences	Small	Large
Orbits	Squared, lower, relatively smaller with rounded margins	Rounded, higher, relatively larger with sharp margins
Forehead	Steeper, less rounded	Rounded, full, infantile
Cheekbones	Heavier, more laterally arched	Lighter, more compressed
Mandible	Larger, higher symphysis, broader ascending ramus	Small, with less corpal and ramal dimensions
Palate	Larger, broader, tend to U-shape	Small, tends to parabola
Occipital Condyles	Large	Small
Teeth	Large, lower M1 often more 5 cusped	Small, molars often 4 cusped

Table 1: Some Traits Diagnostic of Sex in the Skull, after Krogman and Iscan 1986: Table 6.3 estimates)

There are many discriminant function analyses to verify the subjective assessment of gross macroscopic morphological estimations of sex (Helmuth 1993:3; Krogman and Iscan 1986). With regards to the bones from ossuary interments, osteologists have effectively demonstrated the use of the bimodal distribution of femoral head diameters in order to determine sex (Pfeiffer 1980; Krogman and Iscan 1986:236-240; Anderson 1964:34; Ubelaker 1974:42-43). Unfortunately, the sexes overlap considerably toward the centre (Pfeiffer 1980:61; White 1991:323), and thus, many femora are not "sexable." Overall, the employment of metrics on fragmentary remains is usually limited, or impractical due to missing landmarks or incomplete bones (Jerkic 1975:193; Katzenberg and White 1979:26).

One of the most important tasks for osteological analysis, especially due to its value for setting up a demographic profile, is the determination of age (Helmuth 1993:2). Although there is some error when combining aging techniques, the most reliable approach to aging is examining multifocal age sites (Van Gerven and Armelagos 1983:355; Helmuth 1993:2; White 1991:319; Katzenberg and White 1979; Jackes 1992). These include: the dentition, symphyseal face, cranial suture closure, auricular surface, sternal ribs and epiphyseal closure (White 1991:308-319; Krogman and Iscan 1986:103-188; Bass 1988; Pfeiffer 1985).

The problems and limitations of these methods (see Jackes 1992) are compounded when osteologists have only isolated bone fragments. For example, it is impossible to double check the degree of overaging when using Todd's method of symphyseal face changes (Katzenberg and White 1979). This method can over-estimate age for females as the result of parturition scars breaking down the symphyseal face (Saunders 1978).

There are several other factors compounding the methodological and interpretational value of age and sex profiles. First, the diagnostic elements for aging and sexing are usually lower in number than MNI (e.g. Katzenberg and White 1979; Pfeiffer 1983:12). Second, poor bone preservation results in a bias towards adults since they are less susceptible to the destruction of taphonomic agents (White 1991:374; Jerkic 1975). Third, although the innominate is most reliable for determining age and sex of adults, its diagnostic features frequently succumb to breakage and obliteration in ossuary interments (Katzenberg and White 1979:12).

### **Problems of Overlaying Contemporary Aging and Sexing Techniques on to Past Populations**

There is one fundamental demographic assumption that is being questioned by researchers: Is it valid to overlay contemporary methods of aging and sexing on past populations (White 1991:372)? Bocquet-Appel and Masset (1982:324; see Roth 1991:177) state that true age estimations at death for unknown populations are indeterminable since they passively reflect the

reference population. This is also supported by Jackes (1992:214, 1993:435). Moreover, the derived standards from reference populations are biased since sexual dimorphism and age structure are population specific (White 1991:322; Roth 1992:117, summarizing Bocquet-Appel and Masset [1982]).

### **Representativeness of Ossuary Samples**

In relation to the representativeness of ossuaries, there is a degree of uncertainty since the Huron had "selective exclusion of certain age classes and persons dying under specified conditions" (Saunders 1986:9). Although there are methods to account for missing infants (e.g., estimators such as the Juvenile: Adult ratio or the Mean Childhood [Jackes 1992:215; Katzenberg and White 1979:19] and there is limited archaeological evidence suggesting the inclusion of individuals dying of violence, the net result is that prehistoric demographic profiles are probably inaccurate (White 1991:374); they should be reconstructed and interpreted critically. Nonetheless, as Katzenberg and White (1979:26) state:

...in comparison to other skeletal samples, ossuaries are probably the single best source of demographic information ... The major problem is not whether the sample represents the population, but how to reconstruct a population of individuals from a mass of articulated bones.

### **OSSUARIES AND NON-METRIC VARIATION: THE AFFINITY OF PAST IROQUOIAN POPULATIONS**

Non-metric traits are osteological features that are simply difficult to measure on an interval scale (Saunders 1989:95; Berry 1968:103; Hauser and Stefano 1989:1). These traits include variations in anatomic details in bones and teeth in the form of differently shaped and sized cusps, tubercles, crests, roots, or foramina (White 1991:334; Anderson 1968:136). Non-metric traits have been used by bioarchaeologists to infer:

- 1) microevolutionary trends (Anderson 1968:135);
- 2) biological affinities through space and time (Saunders 1978, 1989; Berry 1968; Molto 1983:2, 1985:58; Hauser and Stefano 1989:1).

In Ontario and New York, bioarchaeologists have used non-metric traits, as well as metric traits to trace the "origins" of the historic Iroquoian polities (Anderson 1964; Molto 1983; Jerkic 1975; Sempowski et. al. 1988, see L.P. Saunders 1986). The underlying assumption is that populations which display the most similarity in the incidence of nonmetric traits are the most closely related (White 1991:369; Andersen 1968:136).



Most ossuaries present a unique opportunity for affinity studies since they theoretically approximate a Mendelian population: the large number of individuals interred represent a single breeding population. The methods used to test biological affinity should not be used uncritically. There are several interrelated theoretical and methodological limitations in using nonmetric traits:

- 1) the uncertainty about the genesis and meaning of non-metric traits;
- 2) the necessity of selecting "independent" nonmetric traits (White 1991:369);
- 3) the problems with recording non-metric frequencies;
- 4) the occurrence of inter- and intra-observer error.

### **The Genesis and Meaning of Nonmetric Traits**

Genetic conclusions based on nonmetric traits must be critically evaluated since there is uncertainty as to the degree to which nonmetric traits are genetic markers (Berry 1968:104; White 1991:332; Saunders 1989). According to earlier researchers (e.g., Berry and Berry 1967, cited in Saunders 1989:98; Berry 1968:125; Anderson 1964, 1968), the environmental effects on nonmetric traits could be ignored for interpopulation studies. As Berry and Berry (1967, cited in Saunders 1989:98) state: "simple trait frequencies in skeletal samples could act as 'genetic markers' to assess biological variability in ancient populations." There is an assumption that nonmetric traits are directly proportional to distances based on gene frequencies (Saunders 1989:104).

The biological validity of these "genetic markers" is difficult to verify for prehistoric samples. The conclusion that two populations are dissimilar based on nonmetric traits does not prove their genetic dissimilarity: a nonmetric trait is a phenotypic observation (Saunders 1989:104; Hauser and Stefano 1989:1). Environmental factors might have obscured or caused genetic differences in time and space (Saunders 1989:104). Trauma, occupational stress, pathologies, malnutrition, and genetic syndromes are examples of "nonspecific environmental perturbations that mimic or copy genetic perturbations" (Saunders 1989:105). Genetic and environmental factors are equal evocators of nonmetric traits (Saunders 1978:22; 1989:106; Molto 1983:21, 1985:58).

### **The Selection of Nonmetric Traits**

The more susceptible nonmetric variants are to cultural and environmental factors, the less valuable these are for establishing affinity (White 1991:370). Thus, the analyst not only has to choose nonmetric variants which are "independent" of each other, but also

control for traits associated with age and sex. This is a methodological hurdle for skeletal biologists analysing fragmentary remains.

For fragmentary bones, nonmetric traits were originally argued to be highly effective for determining affinity since the variants were perceived as being non-correlated (Berry 1968:126); an assumption necessary for computing distance statistics (Molto 1983:34, 1985:58). The reason why previous researchers observed a low intertrait correlation was probably the inadequate sample size (Saunders 1989:101; Molto 1983:31, 1985:58). Molto (1985:64) states that at least 300 crania are required to effectively detect correlated traits.

Regardless, correlations between traits can reflect genetic or environmental factors (Saunders 1978:33). That is, if nonmetric traits follow a common developmental pathway or they are influenced by similar phenomena (Saunders 1989:101). An example of this is if there are wormian bones (Saunders 1978:36). In addition, Molto (1985:58) states that hypostosis has a pervasive effect on inter-trait correlations, especially in cranial sutures. Some of these trait correlations are biological significant, while others are stochastic associations for population studies (Molto 1985:58). It is important to omit or differentially treat these positively correlated variants since they may produce redundant information (Molto 1985:58; Saunders 1978:27). Unfortunately, this reductionist model requires intact crania and infracranial material since it is difficult to identify correlated traits when dealing with isolated and fragmented bones (Molto 1985:59).

Contrary to findings of earlier researchers, the effects of age and sex on trait frequencies are not negligible (e.g. Berry 1968, Berry and Berry 1967, cited in Saunders 1989; Anderson 1964, 1968). There appears to be a statistically significant intersex variation for both "individual traits and for multivariate distances calculated from archaeological samples" (Saunders 1989:99; Molto 1985). For example, there is an apparent association between hyperostotic traits and male indices, hypostotic traits and females (Molto 1985:64; Hauser and Stefano 1989:5). Age variation is an important causative component of nonmetric traits as it supplies the end points of genetically controlled and environmentally mediated developmental processes (Saunders 1989:100).

In order to control the effects of sex and age on nonmetric traits, analysts have observed the following measures:

- 1) omitting sex-dependent traits;
- 2) the omission of one sex from distance calculations;
- 3) keeping the proportion of trait frequencies approximately equal for both sexes;

4) the exclusion of subadults from the comparative sample (Saunders 1989:99–100).

The omission of these traits, however, might remove, dilute, or increase the possible intrapopulation heterogeneity and thereby diminish population discrimination (Saunders 1989:100).

Although age and sex traits are largely negligible for interpopulation studies, it is important for researchers to test the effects of age and sex prior to conducting interpopulation comparisons. (Saunders 1989:101). As previously noted, establishing control over age and sex is problematic when analysing isolated and fragmented bones. Moreover, interpopulation studies are limited since the skeletal samples must be demographically similar in terms of age and sex profile (Saunders 1989:101).

### Recording Non-Metric Frequencies

Nonmetric traits can be located on either side of the body, or they can occur bilaterally (Saunders 1989:98). There are two favoured methods for tabulating nonmetric frequencies. Recording nonmetric traits by side (the total number of sides with the trait present) can overestimate the true population frequency of the traits (Saunders 1978:28). Alternatively, tabulating nonmetric traits by individuals (the total number of individuals exhibiting the trait) can underestimate the true population frequency of the traits. Moreover, the divergent trait frequencies of two populations may reflect the different methodology and not genetic differences.

Following Saunders (1989), I argue that recording trait frequencies by the individual is valid for two reasons: 1) nonmetric trait asymmetry is predominately expressed randomly on either side (Saunders 1989:99); and 2) directional asymmetry (i.e., unilateral traits that appear to be consistent with hyperostotic and hypostotic expectations) is minimal enough not to influence sample distance calculations (Saunders 1978:400, 1989:99). This method is not entirely applicable to human material from ossuaries since one deals with "populations of bone," not individuals (Jerkic 1975:74; Anderson 1964:29). Instead, nonmetric traits are recorded by one side in order to avoid redundancy (Saunders 1978:111). This limits the tabulation of nonmetric traits to bones which can be sided, and as a result dilutes and underestimates the true population frequency.

### The Occurrence of Intra-Inter Observer Error

The interpretative and comparative value of distance studies are presently limited due to differences in methods and analysis (Hauser and Stefano 1989:16). The scoring of intra- and inter-observer error has only been recently incorporated into population studies (Molto 1983:81; Saunders 1978). This casts serious doubt on the reliability of earlier studies (Saunders 1989:102).

Poor performance of nonmetric traits in discriminating populations can sometimes be attributed to the list of traits, and the difficulties with trait description and scoring precision (Saunders 1989:105). Scoring precision is particularly poor for partial trait manifestations, and they are presently incomparable (Saunders 1978:403, 1989:102; Hauser and Stefano 1989:16, e.g. Jerkic 197). Ignoring these partial trait manifestations would increase error since information is lost while only working with dichotomized variables (Saunders 1989:104). In terms of the infracranial skeleton, the identification of articular facets extensions and certain tori and tubercles are the source of the greatest error (Saunders 1978:41, 1989:102). For the cranium, traits that reflect tendinous or ligaments and accessory foramina are most problematic (Saunders 1989:102).

### CONCLUSION

The purpose of this paper was to illustrate how skeletal biologists could address broader issues in Ontario archaeology. The information exchanged in this symbiotic relationship between archaeologists and skeletal biologists must be evaluated critically. Skeletal biologists must be aware of the natural and cultural processes that frame their analysis. In analysing ossuaries, skeletal biologists have the advantage of working with skeletal samples that are fairly homogenous in terms of time, space, and constitution (Molto 1983).

Conversely, there are limitations regarding the inference of population demographics, since there is ethnohistoric evidence suggesting the selective exclusion of certain age classes and persons dying under specified conditions (Saunders 1986:9). Due to the prehistoric Huron mortuary practices of depositing bones haphazardly and mixing them, there are analytical restrictions associated with the isolated and fragmentary nature of the bones.

In comparison to other skeletal samples, archaeologists using osteological data from ossuaries have the advantage of having a relatively representative sample of the prehistoric population it served. It is possible to infer differential burial practices or the impact of European diseases on the health of historic Iroquoians health. Archaeologists have a large enough sample in order to test biological affinity between prehistoric and historic Iroquoian populations. This is currently very important for Ontario archaeologists who are tracing the "origins" or development of historical Iroquoian polities.

Current methods for determining sex and especially age at the time of death, however, are inaccurate (Roth 1992:177; Bocquet-Appel and Masset 1982; Jackes 1993:434). These limitations are compounded when analysing fragmentary and isolated bones. Hopefully, histological and dental techniques for aging will remove some of these limitations. Population studies utilizing nonmetric traits to test affinity are restricted and problematic due to unclear



genesis of these morphological variants, and the differential methods used to record them. These methodological problems will be reduced by standardizing ranking schemes, descriptions, statistical techniques, and methods for recording nonmetric traits (Saunders 1989:106; Anderson 1968:142).

It is very important to critically evaluate and clearly state the limitation of your techniques and data. However, it is also important not to dwell on these theoretical and methodological limitations, but to refine techniques in order to optimize the fragmentary information (Molto 1983:2).

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